

Within the Office of Independent Oversight, the Office of Environment, Safety and Health (ES&H) Evaluations' mission is to assess the performance of environment, safety, and health systems (Integrated Safety Management); programs (Worker Safety and Health Program); and practices in protecting our workers, the public, and the environment from the hazards associated with Department of Energy (DOE) activities and sites.

The focus of this Criteria Review and Approach Document (CRAD) is on observing work activities to determine if implementation of systems, programs, and practices result in application of adequate controls to protect against the associated hazards. Where deficiencies are identified, systems, programs, and practices are reviewed to identify if systemic weaknesses are present. This CRAD also includes engagement of workers and their site union representatives with regard to involvement in work planning and safety rights.

A key to success is the rigor and comprehensiveness of our process; and, as with any process, we continually strive to improve and provide additional value and insight to field operations. Integral to this is our commitment to enhance our program. Therefore, we have revised our Inspection Criteria, Approach, and Lines of Inquiry for internal use to include additional focus on 10 CFR 851 “Worker Safety and Health Program” requirements. We continue to make them available for use by DOE line and contractor assessment personnel in developing and

implementing effective DOE oversight and contractor self-assessment and corrective action processes; the current revision is available at <http://www.hss.energy.gov/IndepOversight/ESHE/docs.html>

## **2.0 APPLICABILITY**

The following Inspection Criteria document is approved for use by the Office of ES&H Evaluations.

## **3.0 FEEDBACK**

Comments and suggestions for improvements on these Inspection Criteria, Approach, and Lines of Inquiry can be directed to the Director of the Office of ES&H Evaluations on (301) 903-5392.

## **Performance Based Inspection of Worker Safety and Health Utilizing the ISM Core Functions Inspection Criteria, Approach, and Lines of Inquiry**

The following provides an overview of the typical activities that will be performed to collect information to evaluate the core functions and implementation of integrated safety management. Several terms used throughout this document are defined as follows:

- The term “work activities” encompasses various types of projects including restoration, maintenance, operations, research and development (R&D), and other work activities that could expose the workers, public, or environment to hazards.
- The term “hazard analysis” includes consideration of radiation safety, nuclear safety, human factors, industrial safety, industrial hygiene, occupational health, occupational safety, fire protection, environmental impact, and environmental sustainability.

### **Core Function #1 Define the Scope of Work**

**Inspection Criteria:** Line management ensures that the site office, contractors, and sub-contractors utilize systematic mechanisms to define the scope and schedule of work and identify associated risks and hazards so that the plan at each successively lower tier reflects an increasingly detailed description of the work to be performed.

**Inspection Activity:** Through interviews and document reviews, evaluate the involvement of line managers, planners, subject matter experts, and workers in the planning, review, and approval of work definition for projects for site, facility, and building work activities.

**Inspection Criteria:** Work control systems and procedures that address definition of work scope are developed for all types of work activities and are effectively implemented. These processes ensure that the scope of all work is clearly defined, communicated, and bounded such that hazards to workers, the public, and the environment can be effectively identified and analyzed.

**Inspection Activity:** Review contractor requirements, implementing procedures, guidance, and facility specific procedures governing work control processes. Review planned and in-progress work and corresponding technical work documents. Review existing project plans and hazard identification and analysis documents such as hazard analysis reports, health and safety plans, and other established site or facility-level safety and health and/or environmental permits. Interview managers, Facility Representatives, subject matter experts, work package and procedure writers, workers and researchers, and work planning personnel.

### **Inspection Lines of Inquiry:**

- Are Department of Energy (DOE)/contractor/subcontractor managers and subject matter experts' managers actively involved in the definition of projects to ensure allocation of resources can be addressed?

- Is the DOE oversight of project and work definition commensurate with the level of complexity and hazards?
- Have ES&H requirements been appropriately flowed down to subcontractors (i.e., operations, maintenance, service, D&D, construction, etc.)?
- Do project documents and site or facility safety envelopes and permits adequately bound the scope of work defined in work orders, procedures, and/or instructions? Does the work definition process include a screening against the existing safety envelope and/or permits?
- Have higher-level work documents, such as project plans, been translated into discrete work packages and procedures with well-defined boundaries and interfaces?
- Are work packages sufficiently detailed, based on work activity and degree of hazard, to establish a clear understanding of the work to be performed and how safety is integrated into that work?
- Is work defined at the task level such that the hazard reviewers (workers and their elected representatives, supervisors, planners, and appropriate environment, safety, and health (ES&H) personnel) can readily identify the hazards and risks associated with both the work activities and the environment/location in which it is performed?
- Do work-planning processes provide for involvement of workers and their elected representatives and ES&H staff to fully define the work and allow effective identification of hazards?
- Are work activities properly prioritized to allow adequate allocation of resources and scheduling based on the importance of the work, safety impact, and risk?
- Have adequate personnel and equipment resources been identified for the performance of work, including operations, maintenance, and ES&H support (personnel exposure monitoring and area surveys)?
- Is the work observed adequately bounded by approved work packages, procedures, and permits?

## **Core Function #2 Analyze the Hazards**

**Inspection Criteria:** Work systems and procedures are developed and effectively implemented that ensure hazards for all work are identified and appropriately analyzed based on the significance of the hazards. Prior to the initiation of work, line management identifies, analyzes, and categorizes the hazards associated with the work activity so that the hazards are eliminated or appropriate engineering controls, administrative controls, and personal protective equipment (PPE) can be put in place to prevent or mitigate those hazards.

**Inspection Activity:** Review work planning and control processes and implementing procedures. Interview personnel including work planners, subject matter experts, and workers. Review project work packages, procedures, and corresponding hazard identification and analysis documents such as hazard analysis reports, safety plans, job safety analyses, activity hazard analyses, health and safety plans, radiological work permits, as low as reasonably achievable reviews, and other safety and health and/or environmental permits. Review workplace hazard baseline surveys, personnel exposure assessments, and environmental surveillance and monitoring data.

**Inspection Activity:** Perform facility/building walk downs and inspections, and observe selected work activities, such as restoration activities, research and development, operations, maintenance and construction.

**Inspection Lines of Inquiry:**

- Do institutional level ES&H procedures effectively address the hazard analysis process at the working level and are the procedures properly implemented?
- Are standardized hazard assessment processes developed and appropriately graded in their approach based on the complexity of the activity/work, performance frequency, and initial or previous hazard screenings or analysis of the activity as required by 10 CFR 851?
- Do the hazard analysis processes address all types of work activities to be performed including skill of the craft or skill of the performer?
- Do formal procedures guide the development of activity-level hazard analyses and ensure the hazard analyses are tailored to the specific work being performed?
- When work scope and technical work document tasks are changed, does the hazard analysis process require that the hazard assessments be reviewed for impact and are they being reviewed as required?
- Are specific triggers identified for involvement of ES&H professionals in the hazard analysis process, as required by 10 CFR 851?
- Are workers (and their elected representatives) involved in the hazard analysis process?
- Are the responsibilities for ES&H subject matter experts and reviewers for hazard analyses established and understood? Are the reviewers trained and qualified to recognize the hazards associated with the work and identify necessary controls?
- Do planners, workers (and their elected representatives), ES&H professionals, waste management staff, and facility management, walk down work sites to identify activity-related hazards and co-located hazards based on the risk associated with the activity?
- For construction work, is an activity hazard analysis prepared and approved by the construction manager for each construction activity prior to the start of work as required by 10 CFR 851?
- For construction work, does the work control process require workers to acknowledge being informed of hazards and controls associated with assigned work as required by 10 CFR 851?
- For construction work, has a written project safety and health plan been prepared and approved by the construction manager prior to commencement of work as required by 10 CFR 851?
- Have appropriate ES&H requirements, including compliance with 10 CFR 851, been established in construction contracts?
- For the reviewed work activities, have the applicable requirements from the following programs been implemented, where applicable, as required by 10 CFR 851: construction safety, fire protection, explosives safety, pressure safety, firearms safety, industrial hygiene, biological safety, occupational medicine, motor vehicle, and electrical safety?

- Are the environmentally preferable chemicals or materials in use during operations, maintenance, and/or construction activities (i.e., products or services that have a lesser or reduced effect on human health and environment when compared with competing materials)?
- Are waste minimization (substitution, reduction, segregation, and recycling) opportunities or potential conditions for environmental releases identified and analyzed?
- Are resident area hazards and potential for additive or synergistic effects properly considered to identify the introduction of additional hazardous materials or activities?
- When conditions change, are new potential hazards analyzed?
- Are accident scenarios related to hazardous work analyzed and properly considered to mitigate potential occurrence and severity?

### **Core Function #3 Develop and Implement Controls**

**Inspection Criteria:** Management systems for work control are developed and effectively implemented for work activities that ensure development of adequate hazard controls for performing the work safely and mitigating environmental impact.

**Inspection Criteria:** Line management has established processes for identifying and tailoring controls for hazards associated with all facilities, operations, and work activities.

**Inspection Criteria:** Hazard controls are established based on an analysis of hazards, vulnerabilities, and risks in the work environment (e.g., radiological, chemical, industrial, physical, environmental impact, and natural phenomena).

**Inspection Activity:** Review work planning and control processes and procedures. Interview personnel including Facility Representatives, project personnel, group leaders, subject matter experts, managers, work control managers, foremen, supervisors, environmental, safety, and health support personnel, and operations/technician personnel.

**Inspection Activity:** Review selected ES&H requirements, hazard control plans, sampling results, permits (radiological work permits, industrial hygiene/industrial safety, discharge and/or spill response), work packages and other related documents, procedures, pollution prevention opportunity assessments, and monitoring protocols. Observe work activities.

**Inspection Activity:** Interview Facility Representatives, facility managers, project leaders/supervisors, workers, researchers, and ES&H personnel.

#### **Inspection Lines of Inquiry:**

- Has the contractor provided a place of employment that is free from recognized hazards that are causing or have the potential to cause death or serious harm to workers as required by 10CRF851?
- Are standardized hazard controls developed and used in an appropriately graded approach based on project/work complexity and risk, performance frequency, and hazard analysis results?

- Do controls encompass each phase of work performance and all aspects of the work, including potentially abnormal or emergency situations?
- Are the knowledge, skills, and abilities of the work force considered when selecting the form of controls?
- Are qualified worker safety and health staff (e.g., a certified industrial hygienist or certified safety professional) assigned to direct and manage the Worker Safety and Health program, as required by 10CFR851?
- Are the roles and responsibilities for Facility Representatives, ES&H subject matter experts, and reviewers well documented, and are development and implementation of controls established and understood?
- Do environmental, waste management, radiological, health, safety, and operations personnel have an adequate understanding of each other's requirements and processes to minimize environmental impacts and meet regulatory requirements?
- Are workers (and their elected representatives) and appropriate ES&H professionals included on planning teams and involved in hazard control development?
- Are the types of controls (engineering, administrative, and personal protection equipment) applied in the correct sequence and with an appropriate technical basis?
- Are the hazard controls comprehensive and adequate for balancing efficiency and production while ensuring acceptable hazard mitigation or elimination?
- Are corresponding training requirements incorporated into controls and hazard assessments?
- Are workers informed of their rights and responsibilities under 10CFR851 through training, postings, or other means? Do they understand them?
- Are workers'/supervisors' stop work authorities and responsibilities clearly defined for unexpected hazards or safety concerns as required by 10CFR851?
- Do procedures address liaisons and interfaces between organizations to ensure conflicts and overlapping work activities are properly coordinated and resolved?
- Are control sets sufficiently analyzed to ensure they do not conflict or introduce additional hazards?
- Do controls sufficiently provide notification and afford protection to co-located workers who may either be present or traverse the areas potentially impacted by the activity?
- Is independent safety review of the adequacy of controls provided for higher hazard activities?
- Are parameters clearly defined and established in appropriate facility procedures? Are hazard controls sufficient to ensure that facility and other operating limits are not exceeded?
- Have facility safety requirements been clearly translated into facility, building, system, and equipment specific information that are available and usable by workers within the facility?
- Are appropriate permits and other hazard controls from hazard analyses included in approved work documents and are they adequately implemented?

- Are standardized hazard controls developed and used in an appropriately graded approach that considers work complexity, performance frequency, and magnitude of the risks?
- Are work documents complete with adequate procedures, instructions, and/or drawings, and are bounding conditions and limitations clearly specified?
- Are permits appropriately tailored, specified and integrated into the work package (e.g., Lockout/Tagout, radiological work, confined space, hot work, energized electrical, elevated work, and asbestos abatement)?
- Is the reliability of hazard controls for higher risk activities assessed and failure consequences determined and considered?
- Do vehicle fleet maintenance shops utilize American Petroleum Institute (API) rated re-refined oil, retread truck tires, antifreeze/engine coolant recyclers, water recycling/reclamation vehicle wash facilities, and biobased lubricants, fuels and degreasers/cleaners, where practical?
- When project/work scope and tasks are changed, are the hazard controls reviewed for impacts?
- Are training requirements for personnel needed to perform the work in accordance with established controls clearly defined, specified, and implemented?
- Are appropriate analytical parameters and data quality objectives included in sampling and analysis programs?
- Are the required administrative and engineering controls in place at locations where waste is generated and stored (for example, signs identifying less-than-90-day storage areas) per internal and external requirements?
- Do tasks follow practices to maximize the use of safe alternatives to ozone-depleting substances (ODS)?
- Are signs and postings unambiguous and current with regard to hazards and entry requirements?
- Is there appropriate linkage between tasks, hazards, and hazard controls in work control documents?

#### **Core Function #4**

##### **Perform Work Within Controls**

**Inspection Criteria:** Line management ensures that work is safely performed and managed in accordance with requirements and safety management performance expectations. Contractors and subcontractors execute defined requirements such that employees are protected from adverse consequences.

**Inspection Criteria:** Line management has established and implemented processes to confirm that a facility or work activity, as well as the work force and selected hazard controls, are in an adequate state of readiness before authorizing the performance of work.

**Inspection Criteria:** Line management has the responsibility for ensuring that all operations are authorized at a level commensurate with the hazards, and has established work authorization processes for site, facility, and activity-level operations.

**Inspection Activity:** Review, observe, and evaluate processes for authorization of work, including written plans of the day/week, scheduling meetings, morning meetings, readiness reviews, work schedules, experiment review committees, and other mechanisms used to approve, authorize, and release work.

**Inspection Activity:** Observe sampling of work activities. Emphasis will be placed on watching workers perform work using approved work packages and procedures. Evaluators will strive, to the extent possible, to sample a variety of authorized work activities that are available during the data collection schedule.

**Inspection Activity:** Through interviews, document review and work observation, evaluate the oversight of work performance.

**Inspection Lines of Inquiry:**

- Are work activities formally scheduled on the plan of the day, or equivalent mechanisms, to facilitate notification to affected personnel, resolution of scheduling conflicts, identification of resources and support required, prioritization with other work, and availability of required facilities and systems?
- Are pre-job briefings appropriately performed and effective in communicating work scope, prerequisites (including training), hazard control requirements, and permit requirements to all workers? Are job specific and area hazards adequately communicated to all workers before the start of work?
- Is there an effective process that defines the interface requirements between the facility managers, operations, support organizations, and the maintenance organization to ensure that defined work does not overlap and cause conflicts?
- Does the work approval and authorization process define appropriate mechanisms to address significant changes in work scope or method of work completion once initial approval is obtained?
- Have work activities and projects been properly planned, scheduled, reviewed, and authorized? Are methods for authorizing work and verifying the readiness to perform work formal and documented?
- Is proper authorization obtained to perform the work (e.g., project work or work package approval) and immediately prior to start of work (work release – facility/building conditions adequate to start work)?
- Is the work performed in a manner consistent with the defined work scope, established controls, and other limitations?
- Are all precautions and prerequisites met including facility/system configurations, hazard controls, and other conditions?
- Are training requirements and pre-job briefings completed and adequate for the authorized work activity?

- Are personnel qualified and trained to perform the work in accordance with established controls, as required by 10CFR851?
- Are workers knowledgeable of activity/project level instructions and are they competent so the work is performed as described in the work documents?
- Do workers comply with safety requirements which are applicable to their own actions and conduct, as required by 10CFR851?
- Do workers stop work if they believe the task poses an imminent risk of death, serious physical harm, or other serious hazard to workers, coupled with the belief that there is insufficient time to seek effective resolution through the normal hazard reporting and abatement procedures, as required by 10CFR851?
- Do workers/supervisors stop activities and/or correct deficiencies when tasks cannot be performed as prescribed by work control documents or when safety concerns are encountered?
- Is there adequate supervision of activities based on the risk of the work activity? Is the supervisor's span of control adequate based on the complexity of the work, the hazards, and the number of concurrent jobs being supervised?
- Are mission/production pressures appropriately balanced with the requirements to work safely during the observation of work? Do these pressures have the potential to lead to unsafe practices or failure to follow required controls?
- Do personnel adhere to postings, work control documents, procedures, and permits, including working within defined scopes, instructions and hazard controls, and completing required documentation?
- Are quality control/quality assurance provisions accurately and adequately followed during performance of the work?
- Is equipment placed in a safe condition at the end of the work activity or work shift, and properly turned over to the next shift?
- Are ongoing surveys, exposure monitoring, or other analyses conducted to ensure work hazards are not changing and work controls remain effective?
- Are workers allowed to observe monitoring or measuring of hazardous agents and did they receive the results of their own exposure monitoring, as required by 10CFR851?
- Do all personnel comply with established controls including procedure requirements, postings, barriers, limits, sampling and monitoring requirements, stop work limits, and personal protective equipment requirements?
- Are waste generation and storage requirements at the point of generation being performed (for example, hazardous waste containers are labeled and kept closed) within requirements?
- Are hazard controls effective in their ability to maintain releases to the environment as low as reasonably achievable?
- Are activities conducted outside, i.e., construction, waste storage, materials storage, training etc., managed as to assure protection of site resources from wildland fires consistent with site wildland and operation fire management plans or requirements?

- Do workers properly segregate the wastes generated to facilitate the waste management requirements and enhance the pollution prevention opportunities?
- Are the environmental impacts of operations and activities properly managed in accordance with requirements?
- Are environmental and effluent monitoring efforts for operations and construction activities appropriate to characterize pre-operational conditions and to detect, characterize, respond to releases and assess impacts?
- Are surveillance, spill detection, cleanup and reporting actions related to operational, maintenance or construction releases, consistent with site specific, permit and/or regulatory requirements?
- Are emissions from fugitive (air impacts) and runoff (soil, surface water, groundwater, etc.) sources resulting from maintenance and/or construction activities limited, monitored, and controlled in accordance with site specific, permit and/or regulatory requirements?
- Are DOE site office SMEs and Facility Representatives actively involved in the observation of work activities?

### **Core Function #5 Feedback and Improvement**

**Inspection Criteria:** Line management has effectively developed and implemented a feedback and improvement process at the work activity level.

**Inspection Activity:** Review work planning and control processes and procedures, work packages, and assessment/oversight/feedback activity documentation.

**Inspection Activity:** Observe work, including pre- and post-activity briefs and reviews. Review evidence of feedback and improvement such as post-job reviews and other correspondence used to elicit feedback and improve performance.

**Inspection Activity:** Interview Facility Representatives, facility managers, project managers, subject matter experts, work control managers, foremen, supervisors, ES&H staff, operations/technician personnel, workers (and their elected representatives), and research staff.

#### **Inspection Lines of Inquiry:**

- Are formal post-activity review processes (e.g., post-job reviews, operations reviews) established and effectively used?
- Do Facility Representatives, subject matter experts, workers, supervisors, and line managers recognize, report, evaluate, and address accidents, incidents, near misses, injuries, illnesses, exposures and opportunities for improvement in a timely manner and in accordance with established procedures?
- Have employees requested results of inspections and investigations? If so, did they receive the reports, as required by 10CFR851?
- Is feedback from workers effectively solicited and used during work planning, execution, and closeout?

- Are mechanisms provided to involve workers and their elected representatives in the development of the worker safety and health program goals, objectives, and performance measures, as required by 10CFR851?
- Are lessons learned identified and incorporated into the work planning and authorization process?
- Do assessment activities by line oversight (contractor and DOE) include observation of work activities by Facility Representatives, managers, supervisors, and subject matter experts?
- Are deficiencies and weaknesses identified during work activities and assessments appropriately documented and managed in accordance with site issues management processes? Are associated corrective actions developed and implemented as required?
- Have findings related to work planning and control from previous Independent Oversight assessments been effectively corrected?
- For issues identified by the current inspection, what prevented contractor or DOE line oversight activities from identifying and correcting the problems?